3D MODELLING YAR CITY

Application of UAVs for archaeological research

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1. INTRODUCTION

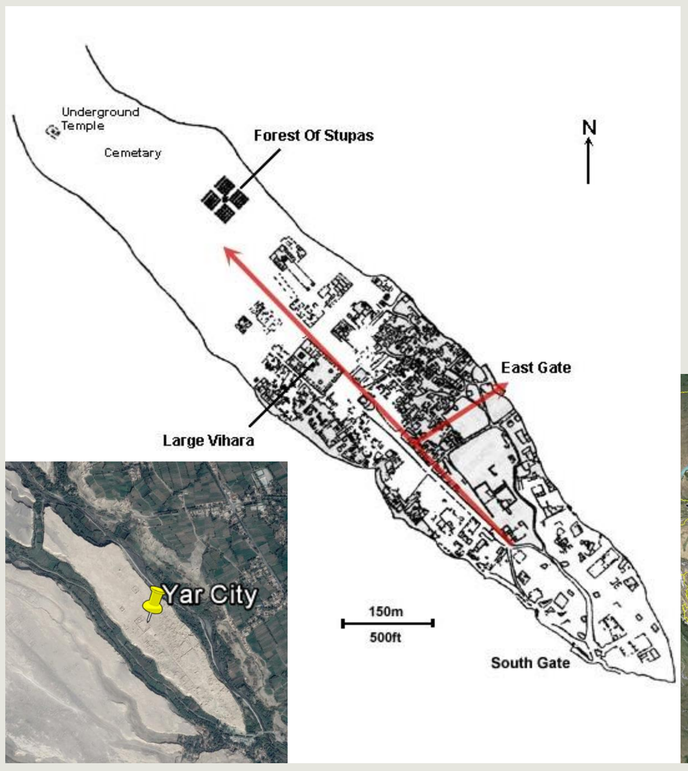
Objectives
Optimizing the workflow of 3D modelling an archaeological site, enhancing the dissemination of 3D models and improving the scientific value of the 3D models for archaeological research

Method
Research on different aspects of the dissemination of 3D models (e.g. data format, computer performance, software, level of detail…)

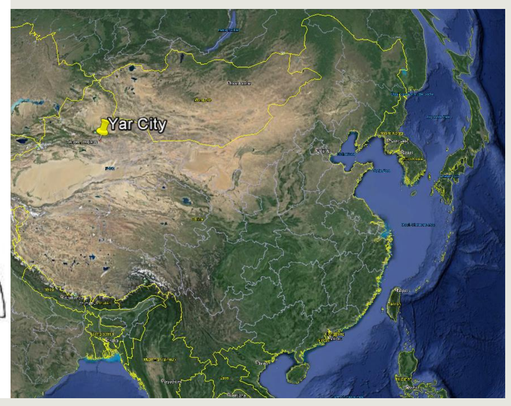
Application of the 3D models
→ Visualization, documentation and conservation of the site
→ Erosion studies on the earthen walls

Workflow
1. Data acquisition
2. Data processing: image based modelling
3. Research on dissemination of 3D models

2. STUDY AREA



Yar city was an important city along the **Silk Road**. The site is generally dated from the **last century BCE** to its destruction in the **13th century CE**. It is one of the largest and best preserved earthen cities in the world.



3. DATA ACQUISITION

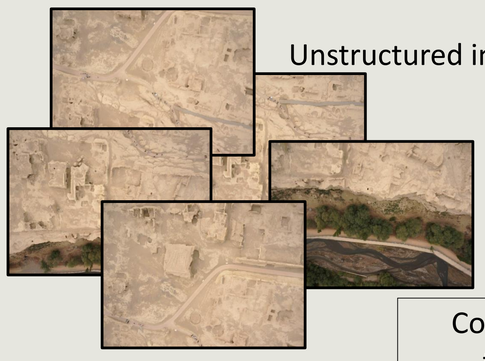
Camera
- Canon EOS 450D
- Sony Nex 5R

Platform
- UAV
- Fishing pole
- Hand

Topographic measurements
- EDM
- Total Station

	UAV	FISHING POLE	HAND
Ease of use	Simple	Unwieldy	Simple
Cost materials	High	Low	Low
Treading the terrain	Not necessary	Necessary	Necessary
Additional equipment	Complex	Simple	Simple
Required technical knowledge	Extensive	Limited	Limited
Data structuring	Structured by flight (programmed)	Structured by path (variable)	Structured by object (variable)
Amount of collected data (resolution vs. area)	Big area, lower resolution	Small area, higher resolution	Small area, higher resolution

4. DATA PROCESSING: IMAGE BASED MODELLING

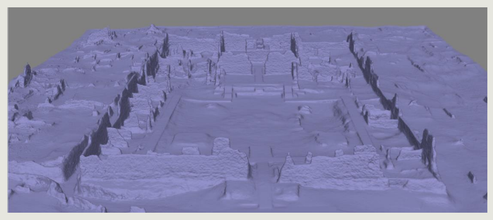


Unstructured images

Point cloud

Computer vision techniques: Structure from Motion & Multiview Stereo

Image textured mesh



Mesh

5. RESULTS

Overview

Great Temple

East Gate

See more on http://cartogis.ugent.be/yarcity3d/index.html

6. CHALLENGES AND FUTURE RESEARCH

Data acquisition and processing
Influence of different light conditions on texture
→ Colour calibration
→ Preprocessing of images

Dissemination of 3D models
Further research on the online visualisation of 3D models
→ view-dependent multi-LOD 3D mesh rendering
→ WebGL - Three.JS

7. ACKNOWLEDGEMENTS

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